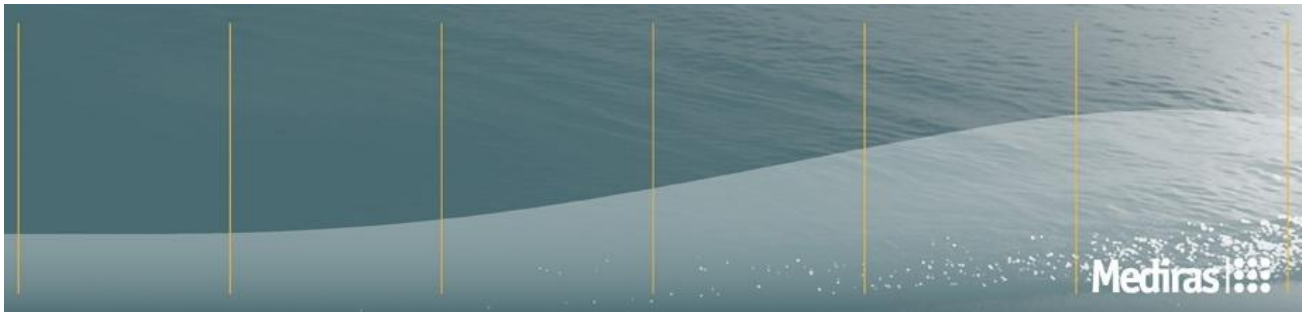
Mediras Membrane Distillation In Remote Areas

Proceedings of the Workshop: "Membrane Distillation in Remote Areas" Djerba, Tunisia



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COOPERATION

November 2010

Acknowledgements

This report has been produced as part of the project MEDIRAS. The logos of the partners cooperating in this project are shown below and more information about them and the project is available on www.mediras.eu:

The work for this report has been performed by WIP and Solar 23.

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Introduction

On the 20th of October 2010 the workshop on “Membrane Distillation in Remote Areas” took place in the LAICO Djerba Hotel, in Djerba, Tunisia. The event started at 10:00 after all participants registered.

The workshop was very successful as it attracted 42 representatives from the target group, including end-users, government institutions and non-governmental organisations. The workshop was organised by the local MEDIRAS partner Solar 23, supported by the Rotary Club.

Neji Amaimia from Solar 23 opened the session, introducing the programme and presenting the partners of the MEDIRAS project. Rotary also presented their organization highlighting its social work in Tunisia mainly in the education and health fields assisting low-income people. The importance of access to water supply and the benefits of safe water in hospitals were highlighted as some of their objectives. Rotary also expressed its interest for a better understanding of the MD system developed within MEDIRAS for the possible use of this technology in the water scarce regions of Tunisia.

Ismail Sibai from Solar 23 presented the company and its history in the solar field. Solar 23 is a company founded in 1975 with several offices all over Africa and in some European markets. They transfer their know how to their facilities in Africa for the generation of clean energy. He remarked the importance of this project, MEDIRAS, where Solar 23 collaborates with European partners with the aim of bringing safe water to people who need it.

MEDIRAS Project and MD technology

Joachim Koschikowski from Fraunhofer ISE made a presentation of 30 minutes about the MEDIRAS project. He explained the objectives, phases, system installations and the role of the different partners.

After presenting the project, Joachim introduced the different solar desalination technologies, powered by PV or solar heat and explained the advantages of MD over other technologies:

- low range of inlet temperatures (60-90°C)
- small footprint
- low sensitivity against fouling and scaling
- all materials can be made of polymers which involves lower cost
- chemical pre-treatment of the water supply is in most cases not necessary.
- operation with intermittent energy supply is possible even without heat storage.

Finally, he remarked the need of energy self sufficient desalination systems for supplying fresh water in remote areas, especially solar desalination due to the abundance of this source in water scarce areas. Membrane distillation has a huge potential in these areas and where there is waste heat available.

Operational Experience from MD systems

Marcel Wieghaus introduced the SolarSpring, spin-off company of Fraunhofer ISE founded in 2009 which develops, constructs and operates the MD systems and other solar water treatment technologies.

Based on the experiences from the installations of the Oxy unit worldwide, maintenance, financing and potential applications were presented. "*After six years of operation of the first system, the water quality is still good and has less maintenance needs than reverse osmosis since non chemical pre-treatment is needed*" he explained. However, maintenance needs in a long term can not yet be specified as it is a new technology but it has a high potential for the future. The main advantages of the Oryx units were analysed:

- High water quality
- No running energy cost. The pumps are power by PV panels
- 100% Renewable Energy desalination
- Easy operation and low-maintenance
- No chemical pre-treatment

Besides the detailed explanation of the technical specifications of the product, the social aspects of the MD installations in remote areas for producing safe water in remote areas, were remarked. He presented the MEDIRAS installation in the health centre in Jdairia-El Bibène, were a disinfection and remineralisation unit are also included. In addition to this, a water management protocol will be followed by the local trained operator for guaranteeing the water quality.

Finally, Marcel concluded with the importance of research on this technology improving performance and reducing its cost since it has a high potential for future the water supply in remote areas with problems of water scarcity.

Discussion

The discussion with the audience was lively and both technical and socio-economic aspects were covered. Some of the technical questions referred to the risk of fouling or scaling, brine discharge and the quality of the inlet water among others. Issues about cost were also discussed, highlighting the need of bringing down the cost of the technology. Additionally the distinction between water costs and water tariffs was stressed, since in remote areas the water cost can be quite high but water tariffs are

low in line with national tariffs. It was highlighted that the system is already competitive for niche applications in remote areas where the alternatives like water network extension or delivery by track are very expensive. Moreover, the higher quality of the water produced by the MD unit compared to other approaches should be also taken into account.

The audience did show high interest on the technology as a solution for the water scarcity problems in Tunisia. Some of the potential applications for MD discussed were irrigation, water supply for rural areas, and desalination of bad quality sea water here other desalination technologies were not suitable. The discussion focussed at the end on the maintenance needs of the technology since one of the barrier stressed was the lack of experts in the desalination field in Tunisia. Regarding these issues the ProDes project was mentioned since it deals with the non technological barriers against renewable energy desalination and some of its activities were training for student and professional, courses, financing, market strategies etc.

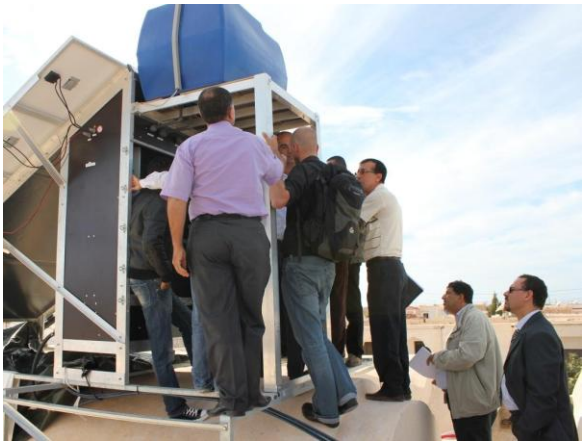
Tunisian experience in water desalination using the solar energy

Abdessalem El Khazen from ANME (National Agency for Energy Conservation) presented the Tunisian experience in renewable energy desalination. Tunisia is a country with water scarcity and most of its groundwater sources have high salinity. Since 2000, Tunisia has a deficit in Energy sources and the government has support the implementation of projects with renewable energy for water production through desalination. Abdessalem described the multiple small RE desalination systems that have been installed in Tunisia within different projects financed by international donors as GTZ from Germany, Spanish and Japanese government and institutions.

Visit of the MEDIRAS installation in the Health Centre

After the workshop, most of the participants visited the membrane distillation system in Jdairia-El Bibène, which has been installed within the MEDIRAS project. An Oryx unit of 150 liters per day has been installed in the roof the local health centre. The fresh water tank has been installed in the kitchen of the hospital together with a remineralisation system and a disinfection system which re-circulates the water through the UV lamp.

The engineer from ISE that installed the system, explained to the group how the system operates and the function of each subsystem. The participants could also see the health centre facilities and after that most of them went to the roof where Marcel Wieghaus gave them a tour of the main components..



Annex I: Invitation

Invitation to the MEDIRAS Workshop

Mediras Membrane Distillation In Remote Areas

www.mediras.eu

20th of October 2010

LAICO Djerba Hotel

BP 125 - 4116 Midoun DJERBA-TUNISIE

Tél : +216 75 751 000

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The MEDIRAS is an R&D project funded by the European Commission through the 7th framework programme. Its overall objective is to optimise the innovative Membrane Distillation technology. Membrane distillation desalinates sea or brackish water and converts it to safe drinking water, powered by solar thermal energy or waste heat. The technology is particularly suitable to small distributed applications with capacity up to 20 m³/day.

The workshop organised in Tunisia will present the technology and report operational experience from several installed units worldwide. A visit to the site of the most recent installation in a rural Tunisian Health Centre will follow.

The workshop will be held in **French and English** with a translation service available. Here is the agenda of the day:

10:00	Opening	Solar 23/Rotary
10:30	The MEDIRAS project and the Membrane Distillation Technology	Joachim Koschikowski, Fraunhofer-Institute for Solar Energy Systems (ISE)

11:00	Operational Experience from MD systems worldwide	Marcel Wieghaus, Fraunhofer-Institute for Solar Energy Systems (ISE)
11:30	Tunisian experience in water desalination using solar energy	Abdessalem El Khazen Project Manager –National Agency for Energy Conservation (ANME)
12:00	Discussion	
12:30	Lunch	
14:00	Transportation to the Health Centre in The Jdairia-El Bibène site	
15:30	Visit and inspection of the desalination installation in the Health Centre	
16:30	Transportation back to the hotel	

This is a free event. For registration contact:

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Fax : + **216 71 333 660**
safa.benmansour@solar23.com

For more information about the project and its activities you can get in touch with the project coordinator:

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MEDIRAS is coordinated by:

Fraunhofer Gesellschaft

MEDIRAS is partly funded by:

COOPERATION

Annex II: Participant List

Mediras Workshop Participants				
	Company	**Surname**	**Name**	**Country**
1	SolarSpring GmbH	Wieghaus	Marcel	Germany
2	Rotary Tunisia	Kallel	Mounira	Tunisia
3	Rotary Tunisia	Ben Ayed	Moufida	Tunisia
4	Fraunhofer ISE	Koschikowski	Joachim	Germany
5	Rotary Tunisia	Taouhida	Maamouri	Tunisia
6	CRDA Mednine	Ellafet	Fadhel	Tunisia
7	STEG Energies Renouvelables	AKREMI	Manel	Tunisia
8	Direction Générale des Ressources en Eau	Ridha	BEJI	Tunisia
9	direction générale du génie rurale et de l'exploitation des eaux	kamel	Meddeb	Tunisia
10	Direction Régionale de la Santé	Regaieg	Sami	Tunisia
11	CRDA Kébili	El guédri	Monji	Tunisia
12	ENIT	Nasri	Fateh	Tunisia
13	Aquatun	Mouhamed Ali	Zaouali	Tunisia
14	CERTE	ElFil	Hamza	Tunisia
15	CERTE	Khaled	Touati	Tunisia
16	CERTE	Boubaker	Ali	Tunisia
17	CERTE	Sika-ali	Mourad	Tunisia
18	UNIPA	Cipollina	Andreas	Italy

19	WIP Munich	Cabañero	Marian	Spain
20	Universität Bremen	Glade	Heike	Germany
21	SolarSpring GmbH	To	Bill	Canada
22	Rotary Tunisia	Kallel	Abdelwaheb	Tunisia
23	Rotary Tunisia	Ben Ayed	Slim	Tunisia
24	ITM-CNR	Figoli	Alberto	Italy
25	ITM	Criscuoli	Alessandra	Italy
26	SONEDE	Abderraouf	Nouicer	Tunisia
27	SONEDE	Ahmed	Soula	Tunisia
28	WIP Munich	Papapetrou	Michael	Greece
29	ClearWater	Wackerhagen	Karl	Germany
30	STEG	BEN MOUSSA	Mohieddine	Tunisia
31	STEG	ATIA	Kamel	Tunisia
32	Rotary Tunisia	Kotrane	Tahia	Tunisia
33	Rotary Tunisia	Kotrane	Samir	Tunisia
34	Rotary Tunisia	El Golli	Mohamed	Tunisia
35	Rotary Tunisia	El Golli	Saloua	Tunisia
36	ENIS	BENTAHER	Hatem	Tunisia
37	YMI	Yamoun	Kamel	Tunisia
38	CRDA Mednine	Smei	Taher	Tunisia
39	Solar 23	Amaimia	Néji	Tunisia
40	Solar 23	Sibai	Ismail	Tunisia
41	Solar 23	Benmansour	Safa	Tunisia
42	Universität Bremen	Ehlting	Nils	Germany